E. F. W. ALEXANDERSON.

AIR INLET VALVE FOR CARBURETERS.

APPLICATION FILED AUG. 21, 1911.

1,083,789. Patented Jan. 6, 1914.

Fig. 1.

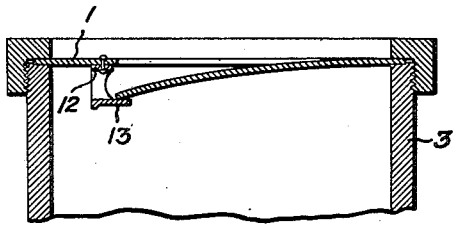
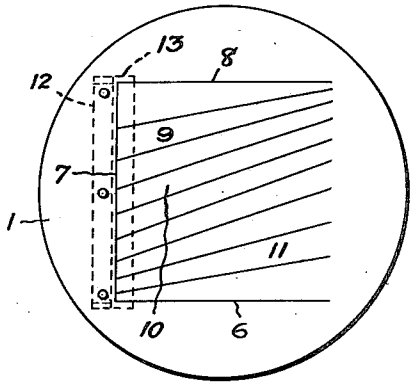


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AIR-INLET VALVE FOR CARBURETERS.

1,083,789. Specification of Letters Patent. Patented Jan. 6, 1914.

Application filed August 21, 1911. Serial No. 645,172.

To all whom it may concern:

Be it known that I, ERNST F. W. ALEXANDERSON, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Air-Inlet Valves for Carbureters, of which the following is a specification.

This invention relates to devices for regulating the admission of air to the carbureter of an internal combustion engine, and especially to carbureters of the injector type, in which the liquid hydrocarbon is sucked through a nozzle by the current of air drawn in by the outward stroke of the engine piston. The vacuum which causes the liquid fuel to be picked up by the air current varies with the square of the velocity of said current. This means that when the piston is moving at slow speeds the ratio of gasolene to air in the mixture will be less than when the engine is running rapidly, so that the mixture may be too weak at starting or at slow speeds and too rich when running fast. Efforts have been made heretofore to remedy this trouble, by providing a valve located in the air intake of the carbureter, or in an opening leading to the pipe conveying the mixture to the engine, said valve being so constructed as to regulate automatically the cross section of the conduit through which the air enters the system; decreasing the area at low speeds and increasing it as the speed increases. By varying the effective cross section directly with the speed, the mean velocity and pressure of the air are kept practically uniform so that the ratio of air to the quantity of gasolene picked up will be more nearly constant at all times. Theoretically these devices should obviate all trouble due to improper mixtures, but in practice they do not always prove satisfactory owing to the inertia of the parts or the distances through which said parts must move in order to effect the necessary alteration in the ratio of air to gasolene. What is needed is a small simple device of extremely light weight whose slightest movement will instantly vary the effective opening for the entrance of air; a device which will respond to the next or almost the next stroke of the engine after the demand for a change in the mixture.

My invention aims to accomplish these desirable ends, by providing an air inlet valve in which a thin strip of resilient metal of light weight controls an opening for the admission of air, being so constructed and arranged that it responds instantly to any change in speed of the engine, and changes the effective area of said opening with every slightest movement.

The novel features of my invention are hereinafter set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a section of an embodiment of my improved air valve. Fig. 2 is a plan view of the same.

In the form shown in the drawing, the valve consists of a plate 1 of thin resilient sheet metal or other suitable material, clamped over the entrance to the pipe 3, which may be the air intake of the carbureter, or an auxiliary air inlet between the carbureter and the cylinder of the engine. The thickness of this plate is much exaggerated in the drawing in order to clearly illustrate the same.

The plate 1 has three cuts 6, 7 and 8 on three sides of a square, and the metal inside these lines forms a tongue or reed which will yield inwardly, when the engine is moving and admit air to the inlet pipe to a greater or less extent. To give better adjustment, the tongue is preferably cut into a plurality of tongues each of which forms as it were a reed controlling an opening into the pipe or other entrance for air. These tongues or reeds may be of any desired number, size or shape. I prefer to arrange the slits so that some of the tongues (9) will have narrow bases and wide ends, while others (10) are more nearly uniform in width from end to end, and still others (11) have wide bases and narrow ends. The flexibility of the reeds is predetermined by the ratio between the width at the base and the width at the top. Thus the tongues 9 will be the first to yield when suction is exerted on the intake pipe. When the suction increases the tongues 10 will open, and finally the tongues 11 will yield; thus varying the effective area of the opening directly with the speed of the engine. The movement of each reed is definitely limited by a stop consisting preferably of a strip 12 secured to the plate 1 to the ends of which is attached flange 13 against which the tips of

the reeds strike when fully open. The metal composing the tongues is so light that it has practically no inertia and so it will respond instantly to any change in suction. The thinness of the metal insures a variation in the size of the opening the instant the tongues move. Hence the valve responds perfectly to the demands of the engine and at the instant the demand occurs, which tends to a smooth and efficient performance of the engine.

When this valve is located at the air intake of the carbureter, it regulates directly all the air flowing to said carbureter. If it is located in an auxiliary air inlet between the carbureter and the engine, it acts like the check valve in a smoke pipe of a furnace, to slow down an otherwise excessive rush of air through the intake of the carbureter, by affording another entrance for air. In this case, however, it must be so designed as not to dilute the mixture to excess, but only to admit enough air to reduce to normal an otherwise too rich mixture. In each case, however, the result is to vary the effective opening of the air intake directly with the speed of the engine.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. The combination with a member defining an opening for the admission of air to the carbureter system of an internal combustion engine of a flat resilient plate covering said opening, said plate being slit to form portions of varying resiliency adapted to yield in accordance with the suction produced by the engine, and means located in the path of movement of said portions to limit the yielding movement thereof.

2. An air inlet valve for the carbureter system of an internal combustion engine, comprising an element permitting the entrance of air, thin resilient tongues of varying width and of different degrees of flexibility arranged side by side in the same plane and serving to vary the effective area of the inlet in accordance with the speed of the engine and means for limiting the movement of said tongues.

3. An air inlet valve for the carbureter system of an internal combustion engine, comprising a plate of resilient metal containing rectilinear slits forming a plurality of tongues of varying width and flexibility adapted to yield under air pressure and afford an opening through said plate varying in area with the air pressure.

4. An air inlet valve for the carbureter system of an internal combustion engine, comprising a plate of resilient metal slit to form a plurality of tongues of varying width and flexibility.

5. An air inlet valve for the carbureter system of an internal combustion engine, comprising a plate of resilient metal containing slits forming tongues adapted to yield under air pressure and afford an opening through said plate varying in area with the air pressure, some having narrow bases and wide ends and others vice versa.

6. An air inlet valve for the carbureter system of an internal combustion engine comprising an element having an opening for the entrance of air, a plate of thin resilient material extending across said opening, a plurality of slits in said plate forming tongues of different degrees of resiliency and a stop to limit the opening movements of said tongues.

In witness whereof, I have hereunto set my hand this 19th day of August, 1911.

ERNST F. W. ALEXANDERSON.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.